Historical evolution and extreme climate events during the last 400 years on the Rhone prodelta (NW Mediterranean)

Titre	Historical evolution and extreme climate events during the last 400 years on the Rhone prodelta (NW Mediterranean)
Type de publication	Article de revue
Auteur	Fanget, Anne-Sophie [1], Bassetti, Maria-Angela [2], Arnaud, M. [3], Chiffoleau, J.-F. [4], Cossa, D. [5], Goineau, A. [6], Fontanier, Christophe [7], Buscail, Roselyne [8], Jouet, G. [9], Maillet, Gregoire [10], Negri, A. [11], Dennielou, Bernard [12], Berné, Serge [13]
Editeur	Elsevier
Type	Article scientifique dans une revue à comité de lecture
Année	2013
Langue	Anglais
Date	2013/12/01
Pagination	375 - 391
Volume	346
Titre de la revue	Marine Geology
ISSN	0025-3227
Mots-clés	benthic foraminifera [14], floods [15], ostracods [16], Rhone delta [17]

Résumé en anglais	The Rhone River is the most important source of freshwater and sediment to the western Mediterranean Sea. Deltaic lobes and littoral prisms compose the sedimentary units that make up the whole “Rhone subaqueous delta”, which reaches up to 50 m in thickness. Individual lobes, that accompanied the retreat of the Rhone during sea-level rise, and the subsequent westward then eastward shift of the main outlet, display averaged sedimentation rates in excess of 1 cm yr− 1, containing both continental and marine material. During the industrial period, most of the river flow was delivered through the Pégoulier and Roustan distributary channels, which evolved under human influence. Within the prodeltas associated to these distributaries, very expanded sedimentation rates (> 10 cm yr− 1), allow the documentation of historical extreme climate events.A 7.71 m long piston core (RHS-KS57) was retrieved from the distal prodelta (79 m water depth). A multi-proxy study was carried out, using microfossil assemblages (ostracods, benthic foraminifera and coccoliths) in combination with sedimentological and geochemical proxies. Our results show that (1) Four different intervals (I–IV, spanning a time-range comprised between ~ 1600 AD and Present-day) have been differentiated from this multi-proxy analysis. They correspond to a different position of distributary channels. Each interval correlates with the different phases of channel avulsion, induced by climate events or by human activity. (2) The signature of extreme floods, that can be identified by the punctuated occurrence of freshwater (continental) ostracods (e.g. Candona spp., Ilyocypris sp.) correlating with increases in grain-size and/or organic carbon content. They correspond to decadal-scale increased runoffs reported in historical archives. Our study demonstrates the relevance of benthic microfossil studies for reconstructing paleoenvironmental changes in transitional (marine/continental) settings.
URL de la notice	http://okina.univ-angers.fr/publications/ua3842 [18]
DOI	10.1016/j.margeo.2012.02.007 [19]
Lien vers le document	http://dx.doi.org/10.1016/j.margeo.2012.02.007 [19]

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[19] http://dx.doi.org/10.1016/j.margeo.2012.02.007